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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/516,653 03/01/00 DOYLE

B P8123

EXAMINER

MMC2/1107
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. BOX 2938
MINNEAPOLIS MN 55402

ART UNIT	PAPER NUMBER
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2823

DATE MAILED:

11/07/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/516,653

Applicant(s)

DOYLE, BRIAN

Examiner

Neal Berezny

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 and 39-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 and 39-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show element 32 in fig. 1f as described in the specification, on page 8. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 19-21 and 26-28 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly

connected, to make and/or use the invention. It is claimed that an etch results in an SOI structure, which is not clear how this is accomplished either in the claims or the specifications.

4. Claims 16-21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 16 states on lines 6 and 10 that the width of the spacer is equal to the thickness of the layer of spacer material deposited. This is not

possible because there is always some lateral etching, which occurs during RIE, regardless of how strongly one biases the substrate.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 19-21 and 26-28 recites the limitations "X" in each claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-6, 9-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapple-Sokol et al. (5,612,255). Chapple-Sokol teaches patterning a first oxide, fig.1A, el.102, forming poly spacers, fig.1B, el.106, by means of RIE, col.2, ln.55, forming a plurality of channels, fig.1C and 1D, el.106 and 116, forming a gate oxide, fig.2C, el.122, col.3, ln.30-32, forming a gate over the channels, fig.2C, el.124, col.3, ln.33-35, in which each channel is a one dimension quantum wire, col.3, ln.60-65. Further, Chapple-Sokol teaches the formation of sources, drains, and contacts, el.132, 134, and 136, col.3, ln.47-51, and anticipates the usage of various isolation

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mechanisms well known in the art, such as use of a SOI substrate, dopant under the trench, and insulator filled trenches, col.3, ln.38-43, and would be obvious for one skilled in the art to employ such processes into the teachings of Chapple-Sokol.

9. Chapple-Sokol does not teach the practice of forming spacers on spacers to further reduce the size of the quantum wire even further. It would be obvious to one skilled in the art to merely duplicate the Chapple-Sokol process twice to further reduce the width of the wire. It has been held that a mere duplication of part or processes involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

10. Chapple-Sokol also appears not to specifically state the use of a nitride spacer mask instead of the poly spacer mask. In terms of spacer masks, nitride and poly are well known to be equivalent materials and it would be obvious to one skilled in the art to substitute one for the other and provide for greater process latitude.

11. Official notice is given that triple gate FET's are well known in the art and it would be obvious to employ multiple gate FET technology to Chapple-Sokol's quantum wire FET to provide for multiple inputs into the switching device and therefore enhance the capabilities of the device.

12. Claims 7-8, 17, 19-28, and 39-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapple-Sokol as applied to claims 1-6,9-16, and 18 above, and further in view of Kendall, (Kreidl Memorial Lecture, Oct. 30, 1995). Kendall teaches the art of quantum wire arrays and related geometries employing studs less than 5nm in width, last par. on page 1. Chapple-Sokol also teaches various geometries of their quantum wires, see col.3. It would be obvious to one of ordinary skill in the art to


employ the claimed geometries in the teachings of both Chapple-Sokol and Kendall. It has been held that mere changes in dimensions to be within the level of one of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Further, applicant has failed to disclose the critical nature or unexpected results arising there from. One would be motivated to combine the teachings of Kendall with Chapple-Sokol in order to reduce the geometries of the QWFET to increase both performance and density of devices.


CONCLUSION

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neal Berezny whose telephone number is (703) 305-1481. The examiner can normally be reached on Monday to Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached at (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


George Fourson
Primary Examiner
2823


11-5-01

Neal Berezny
Patent Examiner
Art Unit 2823